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# ASEG 2012 22nd ASEG Conference and Exhibition News Update (02)

Preparations are underway for the Brisbane conference. The COC has been in place now for some 5 months and the PCO, ARINEX has been appointed. There are two main foci at this time, marketing and 'theming'.

We will be seeking the assistance of kindred societies. Our 'Ambassador without Borders' Koya Suto has already visited colleagues in the SEG and SEGJ to spread the word. We are also currently looking for certain themed days and workshops that can attract delegates not normally seen at ASEG conferences.

Please visit our website at www.aseg2012.com.au to lodge an expression of interest.

*Co-Chairs*: Wayne Mogg and Andrea Rutley
*Technical*: Binzhong Zhou
*Sponsorship*: Ron Palmer and Howard Bassingthwaighte
*Exhibition*: Gary Butler and Dave Burt/John Donohue
*Finance*: Noll Moriarty
*Workshops*: Koya Suto
*Publicity*: Henk van Paridon
*Students*: Shaun Strong
*Social*: Janelle Kuter

Anyone able to help (especially papers) should contact Wayne or Andrea (wayne.mogg@originenergy.com.au or arutley@xstratacoal.com.au)

# 34th International Geological Congress in Australia, 2012

The ASEG, through the Australian Geoscience Council, is part of the team organising the 34th International Geological Congress. This will be held at the Brisbane Convention and Exhibition Centre, 5–10 August 2012.

The Congress provides an excellent opportunity to enhance the reputation of Australian Geoscience and also to show Australia to delegates from overseas.

The First Circular can be accessed by following the link on the Congress website, www.34igc.org. This website will be the main vehicle for dissemination of updated information and provides the key contact details.

The scientific program will cover all aspects of the geosciences. It will demonstrate how geosciences information, knowledge and applications are contributing directly to meeting societal needs; for example through innovation in the resources and energy based industries, better informed land and water management, enhanced understanding and mitigation of climate change and geohazards, and building major cities and infrastructure.

A major theme will be a GeoHost support program for delegates from low income nations. This will be linked to participation in training workshops, particularly for delegates from Africa.

More details will be provided in the February 2011 *Preview*.

*Geothermal energy…the power beneath your feet*

## West Australian Geothermal Energy Symposium

21 and 22 March 2011
Perth Convention and Exhibition Centre, Perth, Western Australia

# CALL FOR PAPERS

The West Australian Geothermal Energy Symposium will bring together scientists, technical experts, policy makers and potential end-users to promote and expand the understanding and utilisation of geothermal energy in Western Australia at all levels. The event will provide a forum to examine the technical, market and regulatory issues critical to the success of the industry and increase public awareness of the opportunities to use geothermal energy.

Our key invited international speaker will be John Lund (USA), who has over 30 years of experience in the geothermal industry and is one of the world leaders in direct use applications and ground-source heat pumps.

The symposium will feature a series of technical sessions sponsored by the Australian Geophysical Exploration Society and supported by the Western Australian Geothermal Centre of Excellence that will focus on the application of geophysical methods to geothermal exploration and development.

Other sessions will focus on identification and development of direct use geothermal projects, ground-source heat pumps, engineering issues and design and building construction considerations.

The **West Australian Geothermal Energy Symposium** is seeking research papers and case studies on the following subjects

- **Exploration for Geothermal Resources**
- **Direct use of Geothermal Energy: district heating/cooling, ground-source heat pumps, sorption chillers, air conditioning and desalination for residential and industrial projects**
- **Power conversion technologies**
- **Business development, funding and economic analysis**

Papers can be presented as talks or posters. In conjunction with ASEG the West Australian Geothermal Energy Symposium provides the opportunity to publish extended abstracts in the conference volume, and peer-reviewed journal articles in Exploration Geophysics.

**Extended abstracts**
All manuscripts must be submitted as extended abstracts by **15 January 2011** and are expected to be no more than four pages in length, conforming to the detailed instructions on the conference website (www.wageothermalsymposium.com.au), and using the template provided.

**Journal articles in *Exploration Geophysics***
Prospective authors are expected to register their interest for publishing scholarly articles in Exploration Geophysics no later than **15 January 2011**. By providing a working title and list of authors in an email to Klaus Gessner (klaus.gessner@uwa.edu.au) or Mike Middleton (michael.middleton@dmp.wa.gov.au). Manuscripts for journal articles must be submitted no later than **15 February 2011**, using the instructions published on the journal website. We expect journal articles to be published 6–12 months after submission. Depending on the volume of submitted journal manuscripts ASEG will consider publishing a Special Volume of Exploration Geophysics.

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**To submit your application, in strict confidence, please forward a CV and covering letter to Peter Williams at peterkw@iinet.net.au . Alternatively, for a confidential discussion, please contact Peter Williams on 0422 593 601**

**All applications and enquiries will be considered confidential.**

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There is scope to be involved in collaborative research, and the practical testing of new technologies in instrumentation, field acquisition and processing.

**Requirements:**

- Degree or higher degree in Geophysics
- Minimum 3-5 years direct in Seismic Acquisition and Processing
- Strong analytical skills, with experience in either survey design/field acquisition or data-driven investigation of algorithms, workflows and technologies
- Strong interest of developing and applying integrated, multi-disciplinary solutions to a wide range of geological problems.
- Ability to work both independently and in a team environment that spans several geographic locations
- Strong written and verbal communication skills

Like to know more?

**To submit your application, in strict confidence, please forward a CV and covering letter to Peter Williams at peterkw@iinet.net.au . Alternatively, for a confidential discussion, please contact Peter Williams on 0422 593 601**

# Update on Geophysical Survey Progress from the Geological Surveys of Western Australia, New South Wales, Northern Territory and Geoscience Australia (information current at 7 November 2010)

Tables 1–3 show the continuing acquisition by the States, Northern Territory and Geoscience Australia of new gravity, airborne magnetic and radiometrics, and airborne EM over the Australian continent. All surveys are being managed by Geoscience Australia.

## Table 1. Airborne magnetic and radiometric surveys

| Survey name | Client | Contractor | Start flying | Line (km) | Spacing AGL Dir | Area (km²) | End flying | Final data to GA | Locality diagram (*Preview*) | GADDS release |
|---|---|---|---|---|---|---|---|---|---|---|
| South Officer 1 (Jubilee) | GSWA | Thomson | 1 Jun 10 | 180 000 | 200 m 50 m N–S | 32 380 | 12% complete @ 7 Nov 10 | TBA | 148 – Oct 10 p23 | TBA |
| South Officer 2 (Waigen – Mason) | GSWA | Thomson | 28 Jun 10 | 113 000 | 400 m 60 m N–S | 39 890 | 45% complete @ 7 Nov 10 | TBA | 148 – Oct 10 p24 | TBA |
| East Canning 3 (Stansmore) | GSWA | Thomson | 14 Jul 10 | 114 000 | 200 m (east) 400 m (west) 50 m N–S | 25 934 | 100% complete @ 2 Nov 10 | TBA | 148 – Oct 10 p24 | TBA |
| Eucla Basin 2 (Loongana) | GSWA | Fugro | 20 Jun 10 | 113 000 | 200 m 50 m N–S | 20 320 | 82% complete @ 7 Nov 10 | TBA | 148 – Oct 10 p24 | TBA |
| Eucla Basin 4 (Madura) | GSWA | Fugro | 1 Jul 10 | 102 000 | 200 m 50 m N–S | 18 220 | 82% complete @ 7 Nov 10 | TBA | 148 – Oct 10 p24 | TBA |
| Eucla Basin 5N (Forrest) | GSWA | Fugro | 16 Jun 10 | 75 000 | 200 m 50 m N–S | 13 040 | 12 Sep 10 | TBA | 148 – Oct 10 p25 | TBA |
| Eucla Basin 5S (Eucla) | GSWA | Fugro | 6 Jul 10 | 87 500 | 200 m (onshore) 400 m (offshore) 50 m (onshore) 100 m (offshore) N–S | 16 100 | 100% complete @ 5 Nov 10 | TBA | 148 – Oct 10 p25 | TBA |
| South Canning 1 (Madley – Herbert) | GSWA | UTS | 19 Jul 10 | 95 000 | 400 m 60 m N–S | 33 520 | 96% complete @ 7 Nov 10 | TBA | 148 – Oct 10 p25 | TBA |
| South Canning 2 (Morris – Herbert) | GSWA | UTS | 1 Jul 10 | 125 000 | 400 m 60 m N–S | 45 850 | 74% complete @ 7 Nov 10 | TBA | 148 – Oct 10 p25 | TBA |
| North Canning 4 (Lagrange – Munro) | GSWA | UTS | 20 Sep 10 | 103 000 | 400 m 60 m N–S | 36 680 | 26% complete @ 7 Nov 10 | TBA | 148 – Oct 10 p26 | TBA |
| Southeast Lachlan | GSNSW | Fugro | 1 Mar 10 | 107 533 | 250 m (NSW) 500 m (ACT) E–W | 24 660 | 100% on 9 Sep 10 | TBA | 144 – Feb 10 p15 | TBA |

*TBA, to be advised.*

## Table 2. Gravity surveys

| Survey name | Client | Contractor | Start survey | No. of stations | Station spacing (km) | Area (km²) | End survey | Final data to GA | Locality diagram (*Preview*) | GADDS release |
|---|---|---|---|---|---|---|---|---|---|---|
| Albany – Fraser North | GSWA | Atlas | 21 Oct 2010 | 9200 | 2.5 km regular | 50 980 | 17% on 1 Nov 2010 | TBA | 146 – Jun 10 p17 | TBA |
| Sandstone | GSWA | IMT | Early Oct 2010 | 6300 | 2.5 km regular | 35 640 | 33% on 7 Nov 2010 | TBA | 146 – Jun 10 p17 | TBA |
| South Gascoyne | GSWA | IMT | 9 Aug 2010 | 9700 | 2.5 km regular | 55 760 | 100% on 27 Oct 2010 | TBA | 146 – Jun 10 p17 | TBA |
| West Arunta | NTGS | Atlas | 6 Jun 2010 | 12 426 | 4, 2 and 1 km | 89 985 | 100% on 15 Sep 2010 | Oct 2010 | 146 – Jun 10 p18 | 10 Nov 10 |

*TBA, to be advised.*

Table 3. Airborne EM surveys

| Survey name | Client | Contractor | Start survey | Line (km) | Spacing AGL Dir | Area ($km^2$) | End survey | Final data to GA | Locality diagram (*Preview*) | GADDS release |
|---|---|---|---|---|---|---|---|---|---|---|
| Frome | GA | Fugro | 22 May 10 | 34 986 | 5000 and 2500 100 m E–W | 95 450 | 100% on 31 Oct 2010 | TBA | 146 – Jun 10 p18 | TBA |

*TBA, to be advised.*

# Levelled ship-track gravity and magnetic data covering the Capel and Faust basins

Levelled ship-track gravity and magnetic data covering the Capel and Faust basins (see Figure 1), offshore eastern Australia, are now available for free download from the Geophysical Archive Data Delivery System (http://www.geoscience.gov.au/gadds). These data were compiled and levelled at Geoscience Australia as part of the Australian Government's Offshore Energy Security Program to aid assessments of the petroleum prospectivity of Australia's remote eastern marine jurisdiction (Hashimoto et al., 2010). Further details on the gravity and magnetic datasets are available in Hackney (2010) or by contacting Ron Hackney (ron.hackney@ga.gov.au).

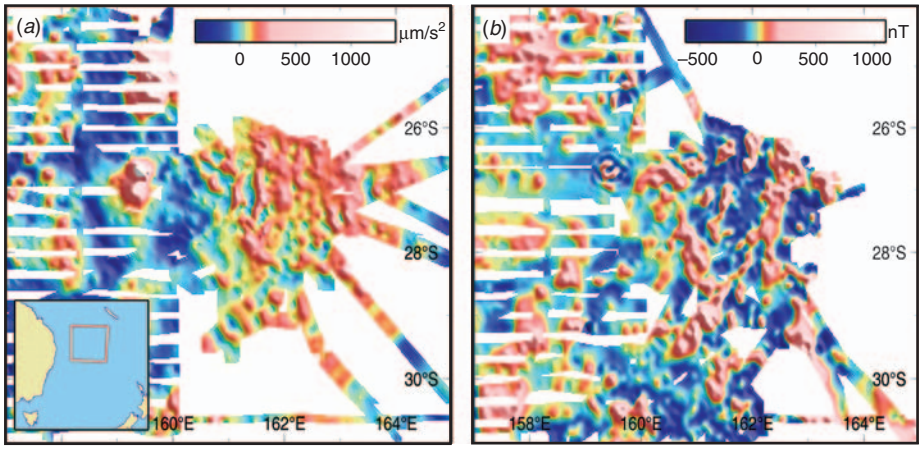


**Fig. 1.** *Levelled ship-track potential-field data covering the Capel and Faust basins. (a) Free-air gravity anomalies (µm/s²). (b) Low-pass filtered (cut-off wavelength 15 km), reduced-to-pole magnetic anomalies (nT). Note that ringing artefacts are evident in the magnetic image near the Gifford Guyot (centred on 159.5°E/26.7°S), a steep-flanked, basaltic seamount that rises from about 2500 m water depth to within about 300 m of the sea surface.*

## References

Hackney, R., 2010, Potential-field data covering the Capel and Faust Basins, Australia's Remote Offshore Eastern Frontier: Geoscience Australia Record 2010/34, 40 pp.

Hashimoto, T., Rollet, N., Higgins, K., Petkovic, P., Hackney, R., and Fraser, G., 2010, Integrated geological assessment reveals insights into the prospectivity of remote eastern frontier basins – Capel and Faust basins, offshore eastern Australia: *AusGeo News* 99.

# Airborne electromagnetic survey within the Cariewerloo Basin, South Australia – data release

In July and September this year approximately 600 line kilometres of AEM were flown over the Cariewerloo Basin, South Australia (Figure 2) under the Primary Industries and Resources South Australia (PIRSA) PACE 2020 initiative. The survey was managed by Geoscience Australia on behalf of PIRSA and used the Fugro TEMPEST system. The survey addresses dual aims of testing the effectiveness and penetration of this technique in the region and delineating the unconformity surface at the base of the Pandurra Formation within the Cariewerloo Basin.

The Cariewerloo Basin within South Australia is considered highly prospective for unconformity-related uranium (Fairclough, 2005; Fairclough and Curtis, 2007). There are numerous key ingredients assigned to this mineralisation system, many of which are found within this Basin. Faulting, both syn- and post-depositional, and an unconformity at the base of the Pandurra Formation provide pathways for fluid flow. Red-bed sediments within the Pandurra Formation indicate an oxidising environment whilst there are numerous possible sources of reducing environments in the Basin including Hutchinson Group equivalent graphitic schists and Wallaroo Group carbonaceous metasediments (Cowley et al., 2003). Also present are the highly enriched Hiltaba Suite granites with

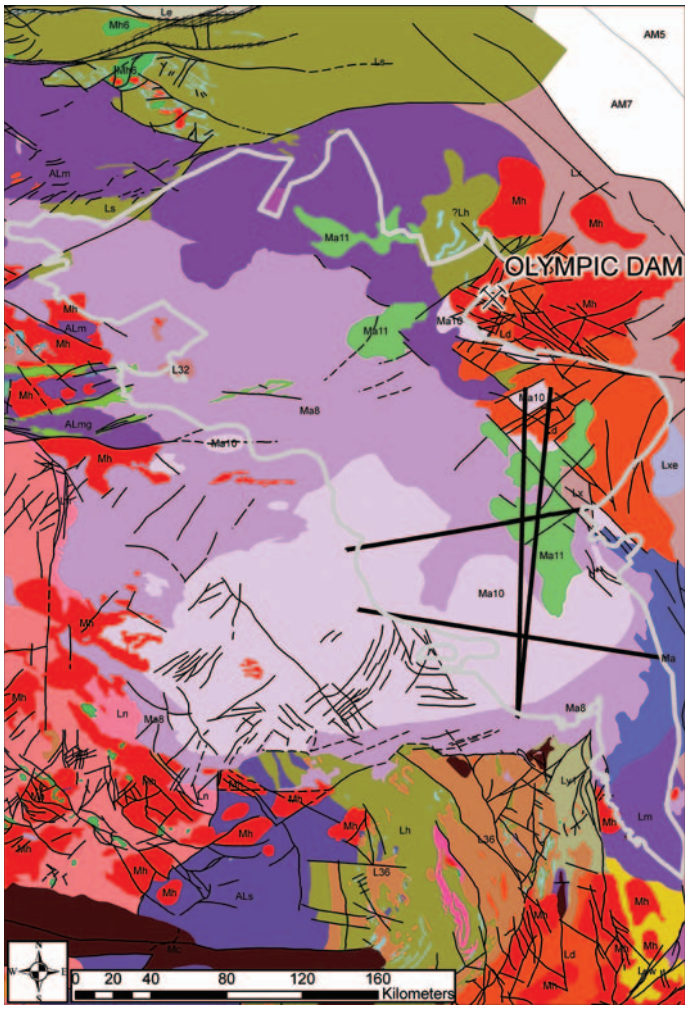


**Fig. 2.** *Location of the Cariewerloo Basin (outlined in grey) and the AEM lines (shown in black) over the Archaean-Early Mesoproterozoic time slice of the South Australian solid geology map.*

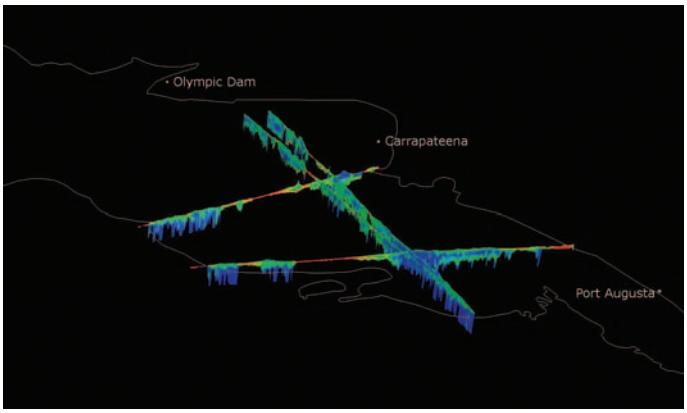


**Fig. 3.** *Geoscience Australia layered earth inversions.*

uranium values ~15–20 ppm or greater and co-magmatic volcanics that provide sources of uranium.

The AEM data has been effective within the region with good penetration in most regions excepting the salt lakes. Both Conductivity Depth Images and Geoscience Australia Layered Earth Inversions (are available for the data (Figure 3). Preliminary interpretations of the AEM outlining the unconformity at the base of the Pandurra Formation have also been created. These datasets were released by PIRSA to the public at the South Australian Explorer's Conference on 26 November 2010 and are now available for download from SARIG (www.sarig.pir.sa.gov.au).

The AEM forms part of a larger project that assesses the prospectivity of the Cariewerloo Basin to host unconformity-related uranium. Within this project detailed sedimentological logging of core is being undertaken and integrated with HyLogger spectral analysis. Geophysical potential field models and basement depth estimates have been created and these data are being analysed along with the AEM to create a 3D model of the Cariewerloo Basin which will be released at the South Australian Resource & Energy Investment Conference, May 2011.

For more information please contact Tania Dhu, tania.dhu@sa.gov.au

## References

Cowley, W.M., Conor, C., and Zang, W., 2003, New and revised Proterozoic stratigraphic units on northern Yorke Peninsula: *MESA Journal* **29**, 46-57.

Fairclough, M.C., 2005, Uranium mineralisation and potential in South Australia: Paydirt Uranium Conference, Adelaide, March, 2005.

Fairclough, M.C., and Curtis, S.A., (compilers), 2007, South Australian Uranium Occurrences – First edition 1:2 000 000 scale: Department of Primary Industries and Resources, SA.

# Business investment in R&D continues to increase

## Australia is in good shape

If a nation's prosperity and future well-being depends on its investment into Research and Development, then Australia is doing well.

Business investment is now at its highest level ever in terms of its percentage of GDP (1.34%) and total investment in all R&D has now increased to $27.7 billion, an increase of $6.0 billion over the 2007–08 levels. This corresponds to 2.21% of GDP, which is also at its highest level (see Table 1).

In 2008–09, business spending on research and experimental development (BERD) in Australia increased for the ninth year in a row to a total of $16.9 billion, according to figures released by the Australian Bureau of Statistics (ABS) on 23 September 2010.

BERD increased by 13% in current price terms and 9% in CPI adjusted terms from 2007–08. Business human resources devoted to R&D in 2008–09 totalled 53 556 person years of effort, an increase of 5% from 2007–08 and an increase of 32% over 2004–05 levels.

Manufacturing and Mining[1] were the largest contributors to BERD in 2008–09, investing $4.35 billion (26%) and $4.24 billion (25%) respectively. Professional, scientific and technical services were next with $2.51 billion (15%) followed by Financial and insurance services with $2.04 billion (12%). Together these four sectors contribute about 80 percent of the national R&D effort.

Of all industries, Mining reported the largest absolute growth from 2007–08, increasing its expenditure on R&D by $860 million – a massive 25% (see Figure 1). This was followed by Financial and insurance services (up $313 million or 28%) and Professional, scientific and technical services (up $233 million or 12%). The Mining R&D results belie those who argue that the resource industries just dig stuff out of the ground. In today's world you have to be smart at whatever you do to be successful and this means investment in R&D.

## Australia climbs up the OECD research league

In the past ten years Australia has increased its BERD from 0.74% of GDP to 1.34% of GDP. In the same period it has also risen in the table of OECD members from 18th to 11th. Table 2 shows the results for selected OECD countries. Australia's position with respect to total R&D investment has also risen. It is now 11th in the OECD table compared to 14th four years ago. A good platform for future prosperity.

Table 1. Total investment in Australia on R&D in $ billions[2]

| | 1996/7 | 1998/9 | 2000/1 | 2002/3 | 2004/5 | 2006/7 | 2008/9 |
|---|---|---|---|---|---|---|---|
| Business | 4.235 | 4.095 | 4.983 | 6.940 | 8.676 | 12.639 | 16.858 |
| Commonwealth | 1.267 | 1.179 | 1.405 | 1.531 | 1.544 | 2.046 | 2.252 |
| States/territories | 0.798 | 0.864 | 0.951 | 0.951 | 0.942 | 1.049 | 1.169 |
| Higher education | 2.308 | 2.555 | 2.790 | 3.430 | 4.327 | 5.434 | 6.717 |
| Private non-profit | 0.186 | 0.225 | 0.289 | 0.360 | 0.479 | 0.609 | 0.744 |
| Totals | 8.794 | 8.918 | 10.418 | 13.212 | 15.968 | 21.777 | 27.740 |
| GERD/GDP | 1.66 | 1.51 | 1.51 | 1.69 | 1.73 | 2.00 | 2.21 |

Table 2. BERD/GDP for selected OECD countries

| | 2002/3 | 2003/4 | 2004/5 | 2005/6 | 2006/7 | 2007/8 | 2008/9 |
|---|---|---|---|---|---|---|---|
| Sweden | NA | 2.86 | 2.66 | 2.62 | 2.79 | 2.66 | 2.78 |
| Finland | 2.34 | 2.42 | 2.42 | 2.47 | 2.46 | 2.51 | 2.77 |
| Japan | 2.36 | 2.40 | 2.38 | 2.54 | 2.63 | 2.68 | 2.69 |
| Korea | 1.90 | 2.00 | 2.18 | 2.29 | 2.49 | 2.65 | 2.54 |
| USA | 1.86 | 1.84 | 1.79 | 1.83 | 1.89 | 1.93 | 2.01 |
| Denmark | 1.73 | 1.78 | 1.70 | 1.67 | 1.66 | 1.66 | 1.91 |
| Austria | 1.42 | NA | 1.53 | 1.70 | 1.73 | 1.81 | 1.89 |
| Germany | 1.72 | 1.76 | 1.74 | 1.72 | 1.77 | 1.79 | 1.85 |
| **Australia** | **0.89** | **0.92** | **0.97** | **1.08** | **1.20** | **1.27** | **1.34** |
| Belgium | 1.37 | 1.31 | 1.29 | 1.25 | 1.30 | 1.30 | 1.32 |
| France | 1.41 | 1.36 | 1.36 | 1.30 | 1.32 | 1.31 | 1.27 |
| UK | 1.25 | 1.11 | 1.09 | 1.06 | 1.08 | 1.15 | 1.1 |
| Canada | 1.17 | 1.16 | 1.18 | 1.15 | 1.11 | 1.05 | 1.00 |
| Netherlands | 0.98 | 1.01 | 1.03 | 1.01 | 1.02 | 1.03 | 0.89 |
| Norway | 0.95 | 0.98 | 0.87 | 0.82 | 0.82 | 0.88 | 0.87 |
| Spain | 0.56 | 0.57 | 0.58 | 0.60 | 0.67 | 0.71 | 0.74 |
| Italy | 0.54 | 0.52 | 0.52 | 0.55 | 0.55 | 0.55 | 0.60 |
| New Zealand | NA | 0.49 | NA | 0.48 | NA | 0.51 | NA |
| Total OECD | 1.52 | 1.51 | 1.48 | 1.51 | 1.56 | 1.59 | |

*NA, not available.*

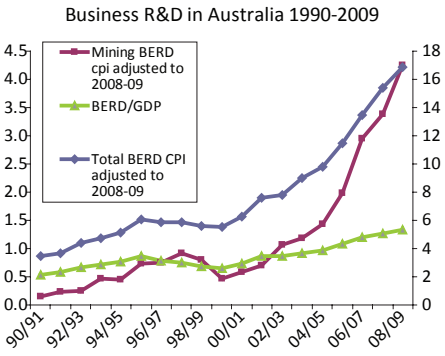


**Fig. 1.** *Right hand axis shows total business R&D expenditure in Australia (BERD) in $billion (blue curve). Left hand axis shows BERD/GDP in % (green curve) and mining (including petroleum) BERD in $billion. All $s are normalised to 2008–09 values.*

Further information is in *Research and Experimental Development, Businesses, Australia, 2008–09* (cat. no. 8104.0), and *Research and Experimental Development, All Sector Summary, Australia, 2008–09* (cat. no. 8112.0), published by the ABS.

[1]Mining includes units that mainly search for and extract naturally occurring mineral solids, such as coal and ores; liquid minerals, such as crude petroleum; and gases, such as natural gas.
[2]These numbers have not been adjusted for inflation.

# Newcrest swallows Lihir as gold price hits record highs

Australia's top gold miner, Newcrest Mining, finally absorbed Lihir Gold Ltd in September 2010. It raised its offer for Lihir to $9.5 billion, winning the support of its target to create the world's fourth-largest listed gold miner. Lihir operated two gold mining projects; the main one in Papua New Guinea on Lihir Island and the other in Victoria – its Ballarat Gold Mining Project.

Lihir Gold Ltd was first listed on the ASX in October 1995 and since 2000 its market capital has risen from approximately $700 million to $10.6 billion in September this year. During the last decade the price of gold has risen from about US$275 an ounce to about US$1400 an ounce. So, even allowing for inflation and the decline in value of the US dollar, the increase in value of gold has been substantial. This is reflected in the value of both Lihir and Newcrest during the last 10 years.

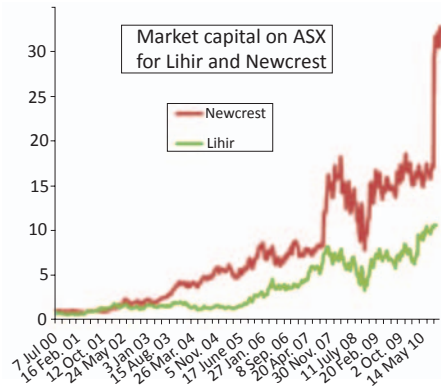


**Fig. 2.** *Market capital of Lihir Gold and Newcrest from 2000 through October 2010. Notice that the increased value of Newcrest, as a result of the takeover (~$15 billion), was more than the value of Lihir, at its maximum ($10.6 billion).*

Figure 2 shows that both companies were valued at about $1 billion until 2002, when Newcrest really took off. Notice the rise in the value of Newcrest in 2010 from ~$17 billion to ~$32 billion in just one month, when the prospective takeover became public knowledge. It appears that Newcrest negotiated a very good deal, because its market capital rose by ~$15 billion as a result of the takeover, whereas, the value of Lihir was only $10.6 billion at its maximum and its reported offer amounted to $9.5 billion. Stock markets really are unpredictable!

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